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PLANETARY PHENOMENA FOR JANUARY AND FEBRUARY, 1921

MALCOLM MCNEILL

PHASES OF THE MOON, PACIFIC TIME.

New Moon.......	Jan. 8,	9^h27^m P.M.	New Moon.......	Feb. 7,	4^h37^m P.M.
First Quarter....	" 16,	10 31 P.M.	First Quarter.....	" 15,	10 53 A.M.
Full Moon........	" 23,	3 8 P.M.	Full Moon.......	" 22,	1 32 A.M.
Last Quarter......	" 30,	12 2 P.M.	Last Quarter.....	Mar. 1,	6 3 A.M.

Mercury on January 1 is a morning star rising about half an hour before sunrise and is therefore too near the Sun for naked eye visibility. It is moving eastward and passes the Sun on Jan. 16, thus becoming an evening star. It is then some distance south of the Sun and for a day or two rises later and sets earlier. Its eastward distance from the Sun now increases, but remains too small for naked eye view until after Feb. 1. It reaches greatest east elongation on Feb. 15 and then remains above the horizon for about an hour and a half after sunset. It is then an easy naked eye object, and can be seen on clear evenings for a week before and a week after the time of greatest elongation. The duration of visibility is shorter than usual as the elongation is only 18°8′, near the minimum, the planet passing its perihelion only eight hours after reaching greatest elongation.

Venus is an evening star in fine position for evening observation, remaining above the horizon for from three and a half to four hours after sunset. It comes to greatest east elongation from the Sun on Feb. 9. Its distance from that body is then 46°46′. The greatest elongations differ only slightly as the orbit is nearly circular, whereas the greatest elongations of *Mercury* differ as much as 50%, the orbit being very eccentric. During the two months the planet moves 56° eastward and 28° northward from *Capricorn* thru *Aquarius* into *Pisces*. It passes the Vernal Equinox on Feb. 2. During the winter months *Venus* will be very bright, far brighter than the other planets, the maximum being reached about the middle of March, half way between the times of greatest elongation and inferior conjunction. Its stellar magnitude will then be -4.3. On Jan. 1 it is only about half a magnitude fainter. During the latter part of February it will be bright enough for naked eye observation in full sunlight. *Venus* passes conjunction with *Uranus* on Jan. 9, with *Mars* also on the same date, the least distance between the planets being rather less than the Moon's apparent diameter. It also passes conjunction with the Moon on the evening of Feb. 11, and for certain parts of the Earth the planet will be occulted. The prediction of a planet's occultation by the Moon for any particular place on the Earth is nearly as intricate a computation as is the prediction of a solar eclipse, a very similar problem.

The year 1921 is a poor one for observations of *Mars*, as it is in the part of its orbit farthest away from the Earth, consequently fainter. It remains an evening star up to the end of June and will be a morning star for the rest of the year. However it will be bright enough and remain far enough away from the Sun for easy visibility until possibly the end of April. During January and February it will not set until about three hours after sunset, the interval diminishing about half an hour during the two months. The planet is moving eastward and northward among the stars in the neighborhood of *Venus*. The conjunction with the latter, on Jan. 9, has already been mentioned. Both planets are moving eastward, *Mars* a little less rapidly than *Venus*. On Jan. 1 it is about 3° east of *Venus*, and at the end of February *Venus* is about 10° east of *Mars*. The actual distance of *Mars* from the Earth is increasing, being at the end of February about double the Earth's distance from the Sun. Its brightness on Jan. 1 is a little less than that of a standard first magnitude star, and during the two months it will diminish a little, but it will still be an easy object for naked eye observation.

On Jan. 1 *Jupiter* and *Saturn* both rise late in the evening, the former a little after 10 P. M. and the latter somewhat before 11 P. M. By the end of February *Jupiter* rises shortly after 6 P. M. and *Saturn* a little more than half an hour later. During the autumn of 1920 both planets have been moving eastward among the stars; but *Jupiter* on Jan. 4, and *Saturn* on Jan. 5 reach their stationary points and begin their westward or retrograde motion. Both planets are then in the eastern part of the constellation *Leo*, *Jupiter* being about 6° west and 1° north of *Saturn*. The common westward motion will continue until late in the spring with *Jupiter* moving a little faster than *Saturn*. The apparent distance gradually increases and reaches 9° by the middle of the spring. During May both planets cease to move westward and begin their eastward or direct motion. The apparent distance now decreases and on Sept. 14 the planets come to conjunction, *Jupiter* passing 1°2′ south of *Saturn*. Unfortunately at this time the planets are too close to the Sun for naked eye view, and come to conjunction with the latter about a week later.

Saturn's rings are not at all conspicuous during the year, the Earth and Sun being nearly in their plane, and until late in the year it will take a good telescope to show them. The Earth passes thru this plane late in February.

Uranus is an evening star during January but is rather too near the Sun for good naked eye view. The Sun's westward motion causes a rapid approach to the planet, conjunction being reached on Feb. 24.

Neptune is in almost exactly opposite position to *Uranus* in the sky, coming to opposition with the Sun on Feb. 1. It is in the constellation *Cancer*, but can not be seen without a telescope.